PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of Naoki HANASHIMA Reio MOCHIDA Serial No.: 10/810,392 Filed: March 26, 2004 Title: **OPTICAL WAVEGUIDE AND METHOD OF FABRICATING THE SAME** Atty. Docket No.: WASH5920	Examiner: Kaveh C. KIANNI Group Art Unit: 2883 Confirmation No.: 8602 Customer No.: 22430 **AMENDMENT**

Mail Stop Amendment
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Responsive to the Office Action mailed February 9, 2006, please amend the above application as indicated below.

A complete listing of the **claims** begins on page **2** of this paper.

Remarks begin on page **6** of this paper.

IN THE CLAIMS:

1. **(Currently Amended)** An optical waveguide, comprising:

a silica substrate;

a **first** buffer layer provided on the silica substrate**, the first buffer layer having a thickness of not less than 1 μm and not more than 5 μm**;

at least one core provided on the **first** buffer layer; and

an upper cladding layer provided on the **first** buffer layer and covering the core,

~~**in which**~~ **wherein** a thermal expansion coefficient of the **first** buffer layer and a thermal expansion coefficient of the upper cladding layer are substantially equal.

2. **(Currently Amended)** The optical waveguide as claimed in claim 1, wherein a refractive index of the **first** buffer layer is higher than a refractive index of the silica substrate.

3. **(Currently Amended)** The optical waveguide as claimed in claim 1, wherein a softening temperature of the upper cladding layer is lower than a softening temperature of the **first** buffer layer.

4. **(Currently Amended)** The optical waveguide as claimed in claim 2, wherein a softening temperature of the upper cladding layer is lower than a softening temperature of the **first** buffer layer.

5. **(Original)** The optical waveguide as claimed in claim 3, wherein at least boron (B) and phosphorus (P) are added to the upper cladding layer.

6. **(Original)** The optical waveguide as claimed in claim 4, wherein at least boron (B) and phosphorus (P) are added to the upper cladding layer.

7. **(Currently Amended)** The optical waveguide as claimed in claim 5, wherein at least germanium (Ge) is added to the **first** buffer layer.

8. **(Currently Amended)** The optical waveguide as claimed in claim 6, wherein at least germanium (Ge) is added to the **first** buffer layer.

9. **(Canceled)**

10. **(Currently Amended)** The optical waveguide as claimed in claim 1, further comprising ~~another~~ **a second** buffer layer interposed between the silica substrate and the ~~above~~ **first** buffer layer, a thermal expansion coefficient of the ~~another~~ **second** buffer layer ~~is~~ **being** between a thermal expansion coefficients of the silica substrate and the ~~above~~ **first** buffer layer.

11. **(Withdrawn)** A method of fabricating an optical waveguide, comprising the steps of:

forming a buffer layer on a silica substrate by using a vapor phase deposition;

forming a core layer on the buffer layer by using a vapor phase deposition;

forming first and second cores by patterning the core layer;

forming an upper cladding layer covering the first and second cores by using a vapor phase deposition, said upper cladding layer having a thermal expansion coefficient that is substantially equal to that of the buffer layer; and

annealing the upper cladding layer to fluidize.

12. **(Withdrawn)** The method of fabricating an optical waveguide as claimed in claim 11, wherein the upper cladding layer are deposited and annealed with multiple steps.

13. **(New)** The optical waveguide as claimed in claim 3, wherein at least germanium (Ge) is added to the first buffer layer.

14. **(New)** The optical waveguide as claimed in claim 4, wherein at least germanium (Ge) is added to the first buffer layer.

15. **(New)** The optical waveguide as claimed in claim 10, wherein a refractive index of the first buffer layer is higher than a refractive index of the silica substrate.

16. **(New)** The optical waveguide as claimed in claim 10, wherein a softening temperature of the upper cladding layer is lower than a softening temperature of the first buffer layer.

17. **(New)** The optical waveguide as claimed in claim 15, wherein a softening temperature of the upper cladding layer is lower than a softening temperature of the first buffer layer.

18. **(New)** The optical waveguide as claimed in claim 16, wherein at least boron (B) and phosphorus (P) are added to the upper cladding layer.

19. **(New)** The optical waveguide as claimed in claim 17, wherein at least boron (B) and phosphorus (P) are added to the upper cladding layer.

20. **(New)** The optical waveguide as claimed in claim 16, wherein at least germanium (Ge) is added to the first buffer layer.

21. **(New)** The optical waveguide as contained in claim 17, wherein at least germanium (Ge) is added to the first buffer layer.

22. **(New)** The optical waveguide as claimed in claim 18, wherein at least germanium (Ge) is added to the first buffer layer.

23. **(New)** The optical waveguide as claimed in claim 19, wherein at least germanium (Ge) is added to the first buffer layer.

REMARKS

This Amendment is responsive to the Office Action mailed February 9, 2006.

Claim 10 was rejected under 35 U.S.C. §112, second paragraph, as the phrase "the above buffer layer" lacked antecedent basis. Reconsideration and withdrawal of this rejection are respectfully requested.

As the Examiner will note, the offending phrase in claim 10 has been replaced with "the first buffer layer", and the previously recited phrase "another buffer layer" has been replaced with "a second buffer layer." Claim 1, therefore, has been amended to recite that the claimed "buffer" is the "first buffer." All claims dependent upon amended claim 1 have been suitably amended to reflect this amendment.

The outstanding Office Action objected to claim 9 as being dependent upon a rejected base claim, but indicated that claim 9 would be allowable if rewritten in independent form, including all of the limitations of the base claim and that of any intervening claims. In reliance thereon, the present amendment incorporates the subject matter of allowable claim 9 into independent claim 1. Claim 1 and its dependent claims, therefore, are believed to be allowable. Claim 9 has been canceled.

New claims 13-23 are presented herewith, each dependent upon allowable independent claim 1. No new matter has been added.

As all pending claims are believed to be allowable as incorporating allowable subject matter, the 35 USC §103(a) rejection is believed to be moot and is not discussed further herein.

Applicants believe that this application is now in condition for allowance. If any unresolved issues remain, please contact the undersigned attorney of record at the telephone number indicated below and whatever is necessary to resolve such issues will be done at once.

Authorization is being provided with this submnission for payment of the fees due for additional claims under 37 C.F.R. §1.16(i) (Fee Code 1202) in the amount of $100.00, to be charged to the American Express card ending in 2006. No additional fees are believed to be due herewith, however, the Director is hereby authorized to charge any additional fees, and to credit any overpayment of fees, which may be required under 37 C.F.R. §1.16 and §1.17, to Deposit Account No. 50-3159, referencing Atty. Docket No. WASH5920.

Respectfully submitted,

Date: March 21, 2006 By: _____

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